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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/582,552	07/25/2007	Tsuyoshi Moriyama	359636-000003	4740
47604	7590	08/26/2009		
DLA PIPER LLP US P. O. BOX 2758 RESTON, VA 20195			EXAMINER ANDREWS, MICHAEL	
			ART UNIT 2834	PAPER NUMBER
			MAIL DATE 08/26/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/582,552	Applicant(s) MORIYAMA ET AL.	
	Examiner MICHAEL ANDREWS	Art Unit 2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 27-52 is/are pending in the application.
- 4a) Of the above claim(s) 28 and 37-52 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 27 and 29-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/9/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is responsive to the Applicant's communication filed July 24, 2009. In virtue of this communication:

- claims 27-52 are pending in the instant application; and
- claims 28 and 37-52 are withdrawn from consideration.

Applicant's election without traverse of group I, species A in the reply filed on 7/24/09 is acknowledged.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Disclosure Objections

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Art Unit: 2834

5. Claims 34 and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The terms "high heat conductivity" and "light weight" in claim 34 are relative terms which renders the claim indefinite. The terms "high heat conductivity" and "light weight" are not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. While examples of such materials are given, there is no definition given as to the limit of "high" for heat conductivity, nor for the limit of "light" regarding weight.

In regard to claim 36, the term "or less" renders the claim indefinite. The claim first defines an exact distance, but the term "or less" creates multiple values of that exact distance. It is not clear whether the reinforcing member is meant to be arranged exactly at the point where the magnetic flux density is decreased by half, or further away.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2834

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 27, 29-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Izawa et al. (US 6,075,297), hereinafter referred to as "Izawa", in view of Chitayat (US 5,783,877).

With regard to claim 27, Izawa discloses a coreless linear motor [LDM2, LDM4] (see figures 6A-6B and 9A-9B) comprising:

a fixed member [1400] (see col. 9, lines 60-67); and

a movable member [20] moving relatively with respect to the fixed member (see col. 9, lines 64-67);

said fixed member having a yoke [141] and groups of permanent magnets [142] fixed to the yoke (see col. 10, lines 4-9);

said movable member having a coil assembly [2] (see col. 9, lines 63-65);

said yoke having first and second facing yoke parts facing each other across a first distance and formed by magnetic materials and a connection yoke part connecting

Art Unit: 2834

first ends of said first and second facing yoke parts (the U-shaped yoke with facing parts and a connection part is clearly shown in figures 9A-9B; also see col. 10, lines 4-16);

said groups of permanent magnets [142] including first and second groups of permanent magnets arranged so as to face the facing surfaces of the first and second facing yoke parts (there are magnets on both the right and left sides in the figure), each of said first and second groups of permanent magnets having a plurality of magnets along the longitudinal direction of the yoke (there are several magnets shown, extending in the direction of movement in figure 9A), in the plurality of magnets of each of said first and second groups of permanent magnets, the magnetic poles of magnets facing each other along the longitudinal direction of the yoke differing from each other, and the magnetic poles of the permanent magnets along the longitudinal direction of the yoke being the same (The polarization of magnets on opposite sides matches, as shown in figure 9A.);

said coil assembly [2] having at least three coils (see col. 5, lines 29-33; LDM4 has the same structure, besides the permanent magnets, as LDM1 and LDM2; see col. 8, lines 24-25 and col. 9, lines 60-62) arranged movably relative to said first and second groups of permanent magnets along the longitudinal direction of said yoke between the first and second groups of permanent magnets (see col. 9, lines 65-67);

said at least three coils being arranged and wound solidly in multiple layers (multiple layers of the coils are clearly visible in figure 9B), the end surfaces of adjacent coils connected with each other via an electrical insulation member [21] (see col. 5,

Art Unit: 2834

lines 19-25; bobbins are well-known to be made of non-magnetically conductive material);

said coil assembly moving in the space between said facing first and second groups of permanent magnets along the longitudinal directions of said yoke (see col. 5, lines 12-16 and figure 9A).

Izawa does not expressly disclose that the coil is fastened by a binder.

Chitayat discloses a coreless linear motor (see col. 1, lines 5-9 and figure 3A) having a movable member [30] with coils [36] (see col. 5, lines 16-34), wherein the coils are fastened by a binder [38] (see col. 5, lines 23-25).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the linear motor of Izawa by fastening the coils with a binder as taught by Chitayat, for securing the coils thereof, since Chitayat teaches that setting the coils in resin aids in cooling the coils (see col. 5, lines 30-34).

With regard to claim 29, the combination of Izawa and Chitayat discloses a coreless linear motor as set forth in claim 27, as stated above, wherein said movable member [30] further has a nonmagnetic reinforcing member [70, 71, 72] fit in solid parts of said coils [36] (see col. 8, lines 18-23 and figures 6a-6c of Chitayat), and

in the cross-sectional shape of said reinforcing member, a length of a side facing said first and second groups of permanent magnets is longer than a length of a side perpendicular to said first and second groups of permanent magnets (see figure 6b; the top surface of the member [70, 71, 72] is clearly longer than its vertical, perpendicular to the magnets, dimension).

Art Unit: 2834

With regard to claim 30, the combination of Izawa and Chitayat discloses a coreless linear motor as set forth in claim 29, as stated above, wherein a hole [52a/b, 54a/b] through which a cooling agent passes is formed (see col. 7, lines 9-24 and figure 5 of Chitayat). The combination does not expressly disclose the hole being formed inside the reinforcing member. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the coolant passage in the reinforcement member instead, for the purpose of moving the passage closer to the coils and improving cooling performance (see col. 4, lines 56-67), since it has been held that merely rearranging the essential working parts of a device would be an obvious matter of design choice. In re Kuhle, 526 F.2d 553, 188 USPQ 7 (CCPA 1975).

With regard to claim 31, the combination of Izawa and Chitayat discloses a coreless linear motor as set forth in claim 30, as stated above, wherein heat radiating fins [60a/b] are formed (see col. 8, lines 1-17 and figure 5). The combination does not expressly disclose the fins being formed in a hole inside said reinforcing member. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the fins inside the hole instead, for the purpose of increasing the heat exchanged to the coolant, since it has been held that merely rearranging the essential working parts of a device would be an obvious matter of design choice. In re Kuhle, 526 F.2d 553, 188 USPQ 7 (CCPA 1975).

With regard to claim 32, the combination of Izawa and Chitayat discloses a coreless linear motor as set forth in claim 29, as stated above, except that the

Art Unit: 2834

combination does not expressly disclose that said reinforcing member [70, 71, 72] is produced by aluminum or an aluminum alloy. However, one of ordinary skill in the art would have known that aluminum is well known for its low thermal resistance and light weight (see col. 7, lines 36-38 of Chitayat), desirable in rotating machines. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use aluminum for the reinforcing member since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

With regard to claim 33, the combination of Izawa and Chitayat discloses a coreless linear motor as set forth in claim 29, as stated above, wherein said movable member [30] is further provided with a holding member [52] and spacers [74] (see col. 8, lines 27-36 and figures 5-6a of Chitayat), and

the two ends of said reinforcing member [70, 71, 72] inserted into said coil assembly [36] are held by said holding member via said spacers (see col. 8, lines 18-23 and figures 5-6a of Chitayat).

With regard to claim 34, the combination of Izawa and Chitayat discloses a coreless linear motor as set forth in claim 33, as stated above, wherein said reinforcing member [70, 71, 72] and said spacers [74] are formed by materials having a high heat conductivity and light weight (see col. 8, lines 31-41).

Art Unit: 2834

With regard to claim 35, the combination of Izawa and Chitayat discloses a coreless linear motor as set forth in claim 34, as stated above, except that the combination does not expressly disclose that said reinforcing member [70, 71, 72] and said spacers [74] are formed by aluminum or an aluminum alloy. However, one of ordinary skill in the art would have known that aluminum is well known for its low thermal resistance and light weight (see col. 7, lines 36-38 of Chitayat), desirable in rotating machines. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use aluminum for the reinforcing member and spacers since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

9. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Izawa and Chitayat as applied to claim 29 above, and further in view of Inagaki et al. (US 2003/0173836 A1), hereinafter referred to as "Inagaki".

With regard to claim 36, the combination of Izawa and Chitayat discloses a coreless linear motor as set forth in claim 29, as stated above, wherein the reinforcing member [70, 71, 72] is arranged spaced from the surfaces of the first and second groups of permanent magnets [31a/b] by a certain distance (see figure 5 of Chitayat). The combination does not disclose spacing the reinforcing member from the surfaces of the permanent magnets by exactly the distance whereby the density of the magnetic

Art Unit: 2834

flux incident upon the surface of the reinforcing member is half or less of the magnetic flux density at the surface of the magnets.

Inagaki discloses that varying the gaps between magnetic components of linear motors affects the magnetic flux incident on the components (see [0008], lines 1-6 of Inagaki). It would have been obvious to one of ordinary skill in the art at the time the invention was made to disclose similar values, for the purpose of increasing motor efficiency (see [0008], lines 6-13 of Inagaki), since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Citation of Relevant Prior Art

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Prior art:

- Binnard (US 6,956,308 B2) discloses a circulation system for a mover of a linear motor;
- Korenaga (US 6,864,602 B2) discloses a linear motor with a coil on the mover surrounded by permanent magnets on a yoke;
- Hwang et al. (US 6,528,905 B1) discloses a cooling system for a linear motor.

Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Andrews whose telephone number is (571)270-

Art Unit: 2834

7554. The examiner can normally be reached on Monday through Thursday between the hours of 7:30 and 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Quyen Leung can be reached at (571)272-8188. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Quyen Leung/
Supervisory Patent Examiner, Art Unit 2834

/M. A./
Examiner, Art Unit 2834